INDEX.

Academy and home for American shipbuilders..... 562
Accident at Braddock..... 528
Accidents in Germany, Preventing.... 32
Accidents, Liability of employers for... 769
Acid conduit, Steel-armored..... 243
Adjustable chimney..... 68
Adjustable ice-grip, Walker's double cutter ice-shave and..... 68
Adjustable stove-pipe 1023
Adjustable three-way cock, Patent.... 861
Ad valorem duties on imports..... 929
Advance in German wages..... 125
Advance in prices in the West..... 685
Advance in silver, The..... 844
Advance in steel, The..... 843
Advance in European wages..... 843
Africa, Commercial rivalries in..... 52
Agriculturists, Organizations of..... 648
Algeria, New iron work in..... 121
Allis' steel barbed and ornamental fencing..... 943
Alloys at different temperatures, Strength of..... 639
Alloys of aluminum 314
Aluminum.....279, 916
Aluminum alloys in the electric furnace, Manufacture of..... 752
Aluminum alloys, Tests of..... 638
American and British shipping..... 596
American and European wages..... 925
American Boiler Manufacturers' Association..... 520
American commerce, Opening San Domingo to..... 77
American engineers in London..... 8
American engineers abroad..... 46
American engineers in Derby..... 321
American engineers in Germany, 120, 160, 200
American market independent..... 763
American nations, Trade prospects with 328
American navy, The new..... 235
American railroad service, Cheapness of 14
American railway master mechanics... 192
American tin prospects.....1005
American works, Foreigners buying... 92
Analysis of manganese ores..... 517
Anchors, Dirigo folding..... 108
Animal-trap, The Ferret..... ... 586
Another blow at trusts..... 877
Anti-rattler and window-holder..... 780
Anti-rattler, Murbarger's..... 108
Anti-trust law, Michigan..... 87
Anti-trust law, Missouri.. 606
Anvil and vise, The Holt combined..... 942
Anvil, A new..... 30
Arrangement of friction-clutch couplings and pulleys..... 996
Archer gas-producer..... 124
Arc safety lamp, The A. & W..... 389
Area of Canada, The immense..... 62
Argentine progress..... 15
Argentine Republic, Speculation in the. 278
Armored cruising monitor..... 914
Armor for the Texas..... 282
Art in hardware..... 447
Ash-sifter, Crosby's patent..... 820
Atlantic ports, Commercial decadence of 684
Atlas hydraulic-screw elevator..... 639
Atwater's pipe-wrench jaws..... 265
Auger-guide, Dobson's..... 741
Auger-handle, Ratchet..... 503
Austin improved steam generator..... 703
Australia, Wealth of..... 165
Automatic drill-press..... 159
Automatic drill, Two-spindle..... 918
Automatic gear-cutting engine..... 951
Automatic steam-trap..... 477
Avery's detachable belt-fastener..... 190
Awards at Paris..... 607
Awl-haft, Humphrey's improved..... 30

Back-band hook, Dixie..... 502
Band-saw guide 954
Band-sawing machine..... 743
Banking Capital, Distribution and control of..... 412
Bankruptcy, Legislation on..... 802
Bankrupt law, A uniform..... 403
Barbed and ornamental fencing, Allis' steel..... 943
Barb-wire industry, Decline of the..... 644
Barb-wire litigation..... 8 9
Barb-wire trade of South America..... 228
Bar folder, Niagara continuous..... 600
Barrett's recessed wash-bowl 109
Basic-steel manufacture in the South... 966
Basic-steel process..... 119
Bath-tub, Indurated fiber..... 305
Bath-tub, Royal Albion..... 623
Bay City, Mich., ship-yards..... 601
Beam-end shear, The Kennedy..... 633
Beams and columns, Strength of..... 32
Beef-tea press, New..... 428
Belt and gear driving-rope..... 983
Belt-elevator, Double-geared..... 999
Belt-fastener, Avery's detachable..... 190
Belt-power bending-rolls.....600, 919
Belt-shifter..... 355
Belt, Leather-link..... 701
Bending-rolls, Belt-power.....600, 919
Bement, Miles & Co.'s new works..... 744
Bessemer pig, The cost of English..... 874
Bessemer-steel production..... 176
Bethlehem ahead of time..... 7
Bethlehem at the maritime exhibition.. 952
Beverage-mixer, Walker's..... 30
Bicycle engine..... 367
Bids for 3000-ton cruisers..... 712
Billet-car..... 275
Bin and sifter, Crary's patent..... 861
Birmingham 21, 932
Bit-holder, Differential-thread..... 389
Black Forest, Clock-making in the..... 495
Blast-furnace management..... 240
Blast-furnaces, Condition of....53, 249, 410, 572, 764, 927
Blast-furnaces, Charging of..... 365
Blast-furnaces, Our idle.....605, 608
Blowing-engine..... 118
Blue-grass palace..... 379
Boiler-feeding, Pumps for..... 558
Boiler incrustation, The prevention of..1024
Boiler-makers..... 646
Boiler Manufacturers' Association, American..... 520
Boiler-plate tests, Groove section for... 711
Boilers, Steel for..... 993
Bolt-cutter, nut-tapper and pipe-threader..... 3
Bolt-threading and nut-tapping machine..... 791
Booming industrial districts..... 724
Boom not wanted, A..... 568
Boom, Trying to check a..... 371
Boring-machine, Stark multiple..... 638
Boston maritime exhibition..... 774
Bower-Barffed iron, Tests of..... 636
Box-strap, A new wire.....1023
Box-making, Metal-edge system of.....1022
Boxes, Taking up lateral wear of 753
Brace-bit, Extension..... 109
Brad-awl handle, Humphrey's..... 69
Braddock, The accident at 528
Brazilian revolution..... 803
Bridge, The Hawkesbury (Australia)... 44
Bridges, Highway..... 438
Bristol truck..... 902
British Columbia, Coal and iron in..... 122
British guns..... 751
British Indian trade in 1888-89..... 93
British iron trade. 168
British iron and metal markets....23, 61, 101, 139, 183, 219, 257, 295, 336, 378, 418, 455, 494, 536, 578, 616, 654, 694, 732, 773, 813, 854, 893, 935, 975, 1014
British prices, Fluctuations in..... 250
Brook's outside window-fasteners... .. 861
Buchan's patent drain-pipe..... 226
Buckle-guard, Hubbard's patent..... 464
Buena Vista Company, The..... 959
Buenos Ayres, Monetary crisis at... .. 409
Buffing-wheel, New form of.....1022
Buildings, Vibration in..... 515
Burgin high-speed engine..... 595
Burglar-alarm, New patent..... 108
Burning of furnace-plates..... 794
Burnishing, Tumbling barrel for..... 88
Business in Canada..... 717
Business men and legislation..... 683
Business situation..... 14
Buyers, The tricks of..... 763
Buying irons by the fracture..... 525

Cable drums, Differential. 716
Cable tramway, The new Providence.. 952

Cables, Erroneous..... 844
Cake molds, Van Dusen's improved.... 31
Calcined lime as furnace flux..... 960
Call-bell, New departure..... 501
Cambria and Gautier..... 672
Canada, Business in. 717
Canada, The immense area of..... 62
Canada's new water-way..... 837
Canadian competition, Railroad transportation and..... 210
Canadian ship-railway..... 110
Canadian statistics..... 277
Canadian steamship lines, Subsidies to. 24
Canadian trade..... 530
Canton glass-board..... 264
Cape Copper Company and the Société. 337
Car-axles, Lubricating..... 209
Car Company, The Pullman..... 637
Car Company's Works, The Minnesota. 289
Carnegie's views..... 1007
Car-service system..... 530
Car-wheels, Machines for rolling..... 199
Carpet-sweepers as lawn-mowers..... 191
Castings, Sand-blast for cleaning..... 918
Cast-iron-pipe trade..... 177
Cast-iron wagon-skeins, Special..... 426
Centennial door-bell..... 501
Chain specialties..... 663
Chamber-pail, Kinney's disinfecting.... 465
Charcoal furnaces October 1..... 609
Charcoal iron-workers.....485, 526, 560
Charging-barrow, McNeil's balanced... 624
Charging of blast-furnaces..... 365
Chattanooga....59, 99, 136, 181, 216, 253, 292, 333, 374, 416, 453, 490, 534, 576, 612, 650, 692, 728, 770, 810, 889, 931, 972, 1011
Check-perforator, Chicago..... 463
Chemical analysis of foundry mixtures. 247
Chemical, Curious..... 246
Chicago....18, 56, 96, 134, 178, 214, 252, 290, 331, 373, 413, 450, 489, 531, 573, 610, 649, 689, 727, 768, 808, 850, 888, 930, 971, 1010
Chicago elevated road projects..... 655
Chicago Horseshoe Company..... 405
Chicago ship-yard, A..... 969
Chicago, Smoke nuisance in..... 448
Chicago's position in the iron trade.... 926
Chicago's proposed water-way 792
Chimney, Adjustable..... 68
Chimney-cap and ventilator, Ryder's balloon..... 389
Chimneys, Philadelphia's tall..... 167
Chrome iron-ore linings in open-hearth furnaces 495
Chuck, The Crabb's..... 387
Cincinnati....19, 59, 98, 135, 180, 216, 255, 293, 334, 375, 415, 452, 491, 533, 574, 613, 652, 691, 729, 770, 809, 854, 889, 932, 970, 1011
Cisatlantic trade 564
Cistern, Galvanized-iron..... 344
Cities, Wonderful growth of our..... 166
Clam-roaster..... 344
Clement Mfg. Company, Novelties of.. 625
Cleveland..19, 58, 97, 135, 180, 217, 254, 292, 333, 416, 452. 492, 576, 614, 651, 692, 729, 770, 811, 850, 888, 931, 971
Clinch for hammers and hatchets..... 387
Cline's monkey-wrench..... 227
Clock-making in the Black Forest 495
Coal and ash-sifter, Rocking..... 625
Coal and iron in British Columbia..... 122
Coal consumption of ocean racers..... 330
Coal-hods, Victor..... 781
Coal market..22, 61, 101, 139, 183, 219, 257, 295, 336, 377, 417, 455, 494, 535, 577, 616, 653, 694, 731, 771, 851, 892, 934, 974, 1013
Coal troubles, Illinois..... 397
Coat and hat hook, Crescent wire..... 109
Coffee-mill, Waddell's improved..... 227
Coffee-pot, The Star..... 463
Coil-boilers for ships..... 324
Coil-boilers, Testing..... 220
Coiling machine, Pipe bending and.... 201
Coke as locomotive fuel..... 814
Coke operators organizing..... 442
Coke, Pineville 876
Coke strike ended 248
Coke transactions, Large.....87, 379
Coke-workers ask an advance..... 120
Coke-workers, Threatened strike of.... 175
Cold-blast furnace for tinners and plumbers 743
Cold saw cutting-off machines..... 122
Collapse of the copper combination..... 408
Colombia, The United States of..... 78
Columbia College improvements..... 503
Columbus door-bell..... 545
Combination, Soft-coal..... 712
Combination, Salt..... 131
Combination stove-truck..... 587
Combination tool-cabinet..... 303
Combination tool, New..... 343
Combination wrench, New... 822
Combinations, The Western war on.... 884
Comfort for the farmer..... 837
Commerce, Interstate..... 296
Commerce of Lake Superior..... 94
Commerce, Opposed to restricting..... 364
Commercial decadence of Atlantic ports 684
Commercial rivalries in Africa..... 52
Common-Sense pole-cap 901
Composite war-ships 282
Compound duplex pump 796
Compound engine, Fore-and-aft..... 435
Compound engine, Tandem... 831
Compressed air as a motive power... 857
Compressed-air system in Paris..... 537
Condenser, Theisen..... 404
Condensing engine..... 679
Condition of blast-furnaces...53, 249, 410, 572, 764, 927
Condition of the iron trade..... 685
Congress at Washington, Pan Americas. 524
Consequences of the steel famine..... 644
Consular service, Our..... 274
Contemplated changes in ocean mail-routes..... 329
Contract trials of new vessels..... 794
Contracts, Long-time.....844, 887
Cooking and heating stoves abroad, 783, 823, 862, 903
Copper combination, Collapse of the.... 408
Copper situation.....266, 328, 885
Cork-puller, The Gilchrist-lightning.... 464
Corbin steam-ship projects..... 161
Corliss steam-engine, Improved..... 520
Corn-cutter, Parker's Lightning..... 465
Corn-husking pin, The Jersey 463
Corn-planter, Procter's three-row..... 741
Cornish or double beat pump-valves.... 162
Correspondence 177, 525, 649, 726, 886
Corrugated elevator bucket..... 68
Corrugating cylinders, Welding and... 756
Cost of English Bessemer pig..... 874
Cost of producing pig..... 687
Cotton and wool, Recent failures in.... 329
Cotton-Seed-Oil Trust case, The..... 5
Countersinking machines, Drilling and 678
Couplings and pulleys, Arrangement of friction-clutch..... 996
Course in electrical engineering..... 766
Craig Russia sheet-iron..... 132
Crane, Foundry..... 714
Cranes, Foundry with 80-ton..... 795
Cranes in railway shops..... 792
Crank, The; Its motion and true value for the transmission of power in practical engineering..... 390
Crary's patent bin and sifter..... 861
Crescent wire coat and hat hook..... 109
Crosby's patent ash-sifter..... 820
Cross battery for electric lighting..... 537
Crown picture-hanger..... 703
Crown picture nail 701
Cruiser Baltimore..... 477
Cruiser Philadelphia..... 411
Cruisers, Bids for 3000-ton..... 712
Cruisers, Proposals for five new..... 319
Cuba and the new sugar company..... 724
Cuba, Late developments in..... 210
Curious chemical..... 246
Curling-iron, The Modjeska..... 463
Currency, A new national..... 795
Current hardware prices...33, 71, 111, 153, 195, 229, 267, 307, 347, 391, 467, 505, 547, 589, 627, 665, 705, 745, 785, 825, 865, 905, 945, 985. 1025
Current metal prices..38, 76, 116, 158, 198, 234, 272, 312, 352, 396, 472, 510, 552, 594, 632, 670, 710, 750, 790, 830, 870, 910, 950, 990, 1030
Cushing, The new torpedo-boat..... 976
Customs decision, An important..... 212
Customs decisions, Recent. 169
Cut prices, Long credits and..... 319
Cutting-off and center-drilling machine, Double..... 798
Cutting-off machine, Engine lathe and.. 836
Cutting-off machines, Cold saw..... 122
Cutting-off tools..... 983
Cutting-tool, The King vise..... 543

Decauville works at Petit-Bourg..... 95
Decision on drawbacks, Treasury..... 124
Decisions, Legal..... 70
Decline of the barb-wire industry..... 644
Demand for heavy rails..... 248
Designs in stove-boards, New..... 503
Detroit..20, 59. 99, 137, 180, 217, 255, 293, 333, 376, 414, 453, 492, 533, 576, 613, 652, 691, 728, 771, 810, 890, 932, 971, 1011
Detroit International Fair..... 48
Developing international communication..... 679
Development Company, The Virginia.. 766
Developments in Cuba, Late..... 210
Developments in Japan, Late..... 967
Developments in Mexico, Recent..... 525
Developments in Peru, Late.... 131
Developments in Uruguay, Late 645
Dictionary of Electrical Words, Terms and Phrases 774
Die-grinder..... 679
Die-stock, Gardner patent..... 427
Differential cable-drums..... 716
Differential rope-block..... 879
Differential-thread bit-holder..... 389
Dipping-tank, Steel-bowl..... 465
Director of the Mint, Report of the.... 726
Direct process, Ramel-Conley..... 640
Dirigo folding anchors..... 108
Discussion on rolling steel rails..... 886
Disinfecting chamber-pail, Kinney's... 465
Disintegation of the trusts..... 723
Distance bell..... 544
Dixie back-band hook..... 502
Dobson's auger-guide..... 741
Door and window screens, Right to use. 191
Door-bell, Columbus..... 545
Door-bell, Centennial 501
Door-bell, Sargent's patent double-stroke..... 31
Door-bells..... 782
Door-bells, Eureka..... 740
Door-hanger, The Prescott..... 545
Door-pull, Indestructible..... 544
Double cutting-off and center-drilling machine..... 798
Double-geared belt elevator..... 999
Duty on partially finished knife-handles 999
Double-locking, German machine for... 388
Double-seamer, Improved roofing..... 305
Double-spoke pulley..... 753
Drain-pipe, Buchan's patent..... 226
Draw-bridge, The largest.....448, 546
Drawing-knife, Swan's..... 781
Drifting tests of steel..... 42
Drill, Endless-belt multiple-spindle..... 564
Drill, New sensitive..... 319
Drill-press, Automatic..... 159
Drill, Two-spindle..... 365
Drill, Two-spindle automatic..... 918
Drill, Upright self-feeding..... 718
Drilling and countersinking machines.. 678
Drummer's latest..... 821
Dry-grinding ore-pan, Revolving..... 920
Duplex pump, Compound..... 796
Duplex pump, The Valley..... 751
Duplex tube-cleaner..... 503
Duties on imports, Ad valorem..... 929
Dynamite gun, Haskell..... 313

Eastern ship-builders busy..... 798
Economic value of electric light and power..... 32
Economizer, Exhaust-steam..... 530
Edgar's Universal nut-lock..... 820
Effect of foreign patents on United States patents..... 248
Effects of the German beam combination..... 1
Eiffel Tower struck by lightning..... 596
Eight horse-power steeple compound... 353
Eight-hour day..... 802
Elaine design lock trimmings..... 821
Electrical engineering, Course in..... 766
Electrical notes..... 943
Electrical Words, Terms and Phrases, Dictionary of..... 774
Electric automatic water-gauge 190
Electric furnace, Manufacture of aluminum alloys in the..... 752
Electric light and power, Economic value of..... 32
Electric-light convention, Notes of the. 320
Electric lighting, The Cross battery for. 537
Electric motors..... 929
Electric railway..... 277
Electric railway, The Gates..... 404
Electric railways using Thomson-Houston system, Notes on..... 84
Electric traveling-cranes at the Paris Exposition.....478, 512
Electric welding..... 559
Electricity, Joule's work in..... 944
Electricity, Welding by..... 634
Electricity, Wire-cable welding by..... 91
Electrolytic copper..... 484

Elevated railroad in Chicago..... 441
Elevated road projects, Chicago..... 655
Elevator bucket, Corrugated..... 68
Elevator gearing..... 126
Elevator stop and lock..... 345
Elevator, The Atlas hydraulic screw... 639
Elevator, The variety hand..... 820
Elliptic gear-cutting machine..... 400
Elliptic springs, Forming..... 44
Elm City metal-cutter..... 544
Elterich's short taps, tap-wrench, &c.. 862
Embreville Company..... 767
Emery-planer, The Newman..... 84
Emery-wheels.....345, 984
Emery-wheel surface-planer..... 518
Endless-belt multiple-spindle drill..... 564
Engine, A bicycle..... 367
Engine bearings..... 936
Engine-lathe and cutting-off machine... 836
Engine, Vertical high-speed..... 123
Engines, High or low speed..... 329
Engines, Petroleum for..... 504
Engines, The Yorktown..... 600
Engineers abroad, American..... 46
Engineering, Mechanics of..... 32
Engineers in Derby, American..... 321
Engineers, Mechanical.....804, 833
Engineers, The mining..... 554
England's production of iron and steel.. 723
English Bessemer pig, The cost of..... 874
English Imperial Institute..... 885
English iron market..... 803
English merchandise marks act..... 524
English pig-iron warrants, The speculation in..... 965
English syndicates, Investments by.... 885
Ericsson's effects..... 767
Erie key-seating machine, The..... 77
Erroneous cables..... 844
Establishing export companies..... 446
Eureka door-bells..... 740
European wages, Advances in..... 843
European wages, American and..... 925
Evan's patent anti-rusting tin-ware.... 150
Example of rope-transmission..... 637
Excellent results in testing copper..... 265
Exhaust-steam economizer..... 530
Exhibition building, An elevated..... 428
Exhibition, The floating..... 744
Exit of Scotch iron, The..... 843
Expansion drill..... 998
Expansion, Limits of..... 456
Expedition, The Scripps League..... 62
Experimental tin-plate plant..... 169
Export companies, Establishing..... 446
Export trade, A few points on the..... 130
Exposition in 1892, Proposed..... 130
Exposition, Paris..... 204,236
Extension brace-bit..... 109
Extortionate profits, Legal restrictions upon alleged..... 644

Failure of S. Robbins & Son..... 4
Failure of the St. Lawrence route..... 15
Fair, Proposed World's..... 165
Famine, The freight-car..... 959
Famous lumber barge..... 476
Farmer, Comfort for the..... 837
Fasteners, Sash-cord..... 860
Fastening device, Wright's patent..... 304
Faulty British war-ships..... 442
Federation of transportation interests.. 683
Fencing, Allis' steel barbed and ornamental..... 843
Ferret animal-trap..... 586
Ferro-aluminum in foundry practice.... 840
Ferro-silicon for machinery castings.... 968
Field guns..... 588
File-cards, Sawtell's improved..... 703
File invention, The great..... 860
Filtering-machine, New..... 871
Financial...21, 60, 100, 138, 182, 217, 256, 294, 335, 376, 417, 454, 493, 535, 578, 615, 653, 693, 730, 772, 811, 851, 891, 934, 973, 1013
Fire-boxes and boilers, Specifications for steel for.....1024
Fire-pot and paint-burner, The Boss. ... 68
Fire-proof construction, Thorough..... 884
Firing pottery kilns with producer gas. 911
Five-wire nail-machine..... 313
Flat-iron, Self-heating..... 264
Floating exhibition..... 743
Flour-bin and sieve, Perfection..... 502
Fluctuations in British prices..... 250
Flues, New method of securing..... 791
Fluid-metal, Rolling..... 212
Fluid-metal rolling process, The Norton 752
Fluid-steel rolling, Rolls for..... 797
Flush-bevel, Witter's improved..... 544
Foot-wiper and scraper, Combined.... 822
Ford & Moncur stoves at Emma Furnace 466
Fore-and-aft-compound engine..... 435
Foreigners buying American works.... 92
Foreign investments in the United States..... 159
Foreign iron and steel trades..... 483
Foreign Markets..23, 62, 102, 140, 184, 219, 258, 296, 336, 378, 418, 456, 495, 536, 579, 617, 655, 695, 773, 813, 894, 935, 976, 1014
Foreign trade, A year's..... 174
Foreign trade in metals, Our..... 211
Forests, The preservation of..... 926
Forge and Iron Company, National.... 403
Fort Payne Furnace Company..... 704
Foundry crane..... 714
Foundry mixtures, Chemical analysis of 247
Foundry pig-iron, the Western outlook. 966
Foundry-practice, Ferro-aluminum in.. 840
Foundry with 80-ton cranes..... 795
Fountains at the Paris Exposition, The illuminated..... 356
Fracture, Buying irons by the..... 525
Franklin Institute lectures..... 610
Freight car famine, The..... 959
Freight rates, Southern.....546, 943
Freights on iron..... 410
Freight on manufact'd iron, Southern.. 797
Freights, Pittsburgh..... 744
Freights, Southern iron..... 411
French tin-plate works..... 250
Friction-clutch couplings and pulleys, Arrangement of..... 996
Friction-clutches..... 438
Front whiffletree coupling, ... 780
Fruit-can and glass-jar holder, Star ... 150
Fuel at Pittsburgh, Securing cheaper.. 126
Fuel oil, Important to consumers of.... 597
Furnace Company, Fort Payne..... 704
Furnace flux, Calcined lime as..... 960
Furnace-plates, Burning of..... 904
Furnace, The new Siemens..... 556
Furnace-valve, Weis reversing..... 601
Furnaces on November 1, The blast... 764
Furnaces, Our active..... 927

G A. Crosby & Co., The new works of 795
Galvanized-iron cistern..... 344
Gardner patent die-stock..... 427
Gas, Firing pottery-kilns with producer 911
Gas-producer, Archer..... 124
Gasoline torch, A new..... 31
Gate, Electric railway..... 404
Gauge, New center..... 86
Gear-cutting engine, Automatic..... 951
Gear-cutting machine, Elliptic..... 400
Gear-wheel, The largest..... 832
Gearing elevator..... 126
Gem patent thermometer sad-iron..... 427
Gem solid steel mincer..... 702
Geneva patent swing-socket fastener... 740
German beam combination, Effect of... 1
German machine for double locking.... 388
German subsidized steam-ship lines.... 91
German wages, Advance in..... 125
Germany, American engineers in, 120, 160, 200
Germany, Preventing accidents in..... 32
Germany's floating exposition..... 213
Gifford's hand snow-shovel and scraper combined..... 624
Girard hydraulic railway..... 402
Glass-board, Canton..... 264
Glass jar holder, Star fruit-can and... 150
Gogebic ore, Output of..... 477
Gold production in 1889..... 684
Goodridge self-heating and folding bath-tubs..... 226
Government as a ship-builder..... 524
Grace contract in Peru, The.....1006
Grate-bar, Hollow..... 753
Gravity, Sorting freight-cars by..... 504
Greatest record..... 764
Great file invention, The..... 860
Griddle, A new steel..... 69
Grinder, Shafting..... 167
Grinding-machine..... 235
Groove section for boiler-plate tests.... 711
Growth of our cities, Wonderful..... 166
Guide, Band-saw..... 954
Gun-boats, U. S. twin-screw..... 16
Gun-carriage, Pneumatic..... 598
Gun-work, Shaping-machine for..... 671
Gun-works, The Krupp..... 753
Guns, Life of heavy..... 944
Guns, The Field..... 588

Hames-fastener, Security..... 586
Hammers and hatchets, Clinch for..... 387
Hamsley metal shingles..... 742
Hand-power punch..... 151
Hand reaming-machine..... 126
Hand-screw, Rapid adjusting..... 343
Handy list of technical literature..... 32
Hard-steel or case-hardened articles, Tinning..... 202
Hardware..25, 63, 103, 140, 185, 221, 259, 297, 338, 380, 420, 457, 496, 538, 580, 618, 656, 696, 734, 775, 815, 855, 893, 937, 977, 1017
Hardware, Art in..... 447
Hartman liquid cinder car..... 713
Haskell dynamite gun..... 343
Hawkesbury (Australia) bridge, The... 44
Hawkins' patent nail-pulle..... 343
Hay-knife..... 265
Hayti, The regeneration of..... 764
Heat-energy into motive power..... 807
Heat in the steam-engine, Preventing waste of..... 831
Heat lost by unprotected steam-pipes... 836
Heavy guns, Life of..... 944
Heavy speed-lathe..... 169
Helicoidal wire cord, Stone-sawing with 353
High-duty attachment, Worthington... 315
High or low speed engines..... 329
High-speed engine, The Burgin..... 595
High-speed engine, Vertical..... 123
High water in the lakes..... 203
Highway bridges..... 438
Hill's latch..... 821
Hip shingle, The Prentice metallic..... 662
Hoist, Portable..... 87
Hollow grate-bar..... 753
Hollow-ware, Never-Break wrought-steel..... 942
Holly steam heating in St. Paul.....1023
Holt combined anvil and vise, The..... 942
Homestead strike ended..... 94
Hooks for plumbing-work..... 942
Horseshoe Company, The Chicago..... 405
Horseshoe, Soft-ground..... 190
Hose-coupling, The Smith..... 69
Hot-air engine, A new..... 473
Hot-blast system of warming buildings. 5
Hotchkiss guns..... 17
How to secure Mexican trade.....1015
Hubbard's patent buckle-guard..... 464
Hubbard's solid-steel husking-pin..... 501
Hudson River bridge at Peekskill..... 175
Humphrey's brad-awl handle..... 69
Humphrey's improved awl haft..... 30
Hydraulic crane, The Kennedy and Aiken..... 754
Hydraulic pressure, Treatment of steel. 85
Hydraulic railway, Girard..... 402

Ice-cream freezer, Keystone..... 150
Ice-creepers, New..... 543
Ice-creeper, The Maine..... 902
Ice-plane, Walker's handy..... 69
Ice-shave and adjustable ice-grip, Walker's double cutter..... 68
Ideal sash-pulley..... 227
Ideal snap..... 502
Illinois coal troubles..... 397
Illinois Steel Company..... 733
Illinois Steel Co.'s new Joliet offices.... 676
Imperial Institute, The English..... 885
Important customs decisions..... 212
Important patent decision..... 265
Important railroad decision..... 199
Important Southern project..... 523
Important tariff decisions..... 126
Importation of Mexican silver-lead ore. 763
Imports....23, 61, 101, 139, 183, 218, 257, 295, 336, 378, 418, 455, 535, 578, 616, 654, 694, 732, 772, 813, 852, 893, 935, 975
Imports, Ad valorem duties on..... 929
Imports for the half-year, Iron..... 247
Imports of iron and steel, Our..... 967
Improved automatic reel..... 701
Improved cooker..... 902
Indestructible door-pull..... 544
Indurated-fiber bath-tub..... 305
Industrial districts, Booming..... 724
Industrial interests, South African.... 54
Ingot-iron, Nitrogen contained in..... 519
Interest rate, Lowering of the..... 287
International communication, Developing..... 679
International fair, Detroit..... 48
Interstate commerce..... 296
Investments by English syndicates..... 885
Investments in the U. S., Foreign..... 159
Iron and steel, England's production of. 723
Iron and steel, Our imports of..... 967
Iron-center wood split pulley..... 358
Iron Company, Reading..... 604
Iron, Freights on..... 410
Iron imports for the half-year..... 247

Iron-making in Rhode Island..... 318
Iron manufacture in Canada, Possibilities of..... 686
Iron manufacturers, Opportunities wasted by..... 967
Iron market, The English..... 803
Iron mines, The Sigua, Cuba..... 997
Iron-molders, Wages of 792
Iron-ore production of New York..... 125
Iron ore, Roasting..... 445
Iron-ore shipments..... 714
Iron projects, Marquette..... 579
Iron, Southern freights on manufactured.....725, 797
Iron, Steel rapidly supplanting..... 597
Iron toys..... 741
Iron trade, British..... 168
Iron trade, Chicago's position in the.... 926
Iron trade, Condition of the..... 683
Iron trade, Prosperity in the..... 925
Iron, Wide distribution of Southern.... 7
Iron-workers, Charcoal.....485, 526, 560
Iron works in Algeria, New..... 121
Iron Works, Pencoyd..... 322
Is Pennsylvania losing her leadership?. 206

Japan, Late developments in..... 967
Japan, Mexico and..... 88
Jeffersonville bridge, The Louisville and 717
Jenkins nut-lock..... 543
Jersey corn-husking pin..... 463
John Crerar's will..... 797
Joliet Steel Works Club.....1009
Joule's work in electricity..... 944

Keeley? Is this another..... 597
Kennedy and Aiken hydraulic crane... 754
Kennedy beam-end shear..... 633
Key-holder, New..... 860
Key-holder, The Waltham..... 426
Key-seat cutting machinery..... 677
Key-seating machine, The Erie..... 77
Keystone ice-cream freezer..... 150
King vise cutting tool..... 543
Kitchen safe, Wright's patent vertical movable..... 387
Knife-handles, Duty on partially finished 909
Knurling machine, Threading and..... 794
Krupp gun works..... 753

Labor organization, The new..... 43
Labor plots and counterplots..... 966
Lake ore output..... 567
Lake-ore trade next year..... 764
Lake ship-building, Activity in..... 605
Lake Superior, Commerce of..... 94
Lakes, High water in the..... 203
Lakes, Ship-building on the..... 951
Lamp, Lucigen..... 168
Largest draw-bridge..... 448
Largest gear-wheel, The..... 832
Late developments in Japan..... 967
Lateral wear of boxes, Taking up..... 753
Lathe for turning spiral forms..... 362
Latrobe Steel Works, The..... 958
Law and the trusts, The..... 275
Lawn-mowers, Carpet-sweepers as..... 191
Laureau pit heating furnace..... 673
Lead-ore decision..... 636
Lead-ore decision, The Mexican..... 644
Lead-ore importations, Mexican..... 967
Lead, Situation in..... 447
Leader oil-can..... 264
League, The Scripps..... 133
Leather-covered pulley..... 1000
Leather link-belts..... 701
Lectures, Franklin Institute..... 610
Legal decisions.....70, 184, 266
Legal restrictions upon alleged extortionate profits..... 644
Legislation, Business men and..... 683
Legislation and bankruptcy..... 802
Lemon-reamer..... 465
Leonard's patent portable storm-house. 625
Letter-stamping machine..... 419
Liability of employers for accidents.... 796
Library and gymnasium, A workmen's. 726
Life of heavy guns..... 944
Life of steel rails..... 7
Lightning-conductor, Nelson cresttile.. 742
Lightning cork-puller, The Gilchrist... 464
Lightning corn-cutter, Parker's..... 465
Lima oil field..... 836
Lime as furnace flux, Calcined 960
Limits of expansion..... 456
Liquid cinder-car, The Hartman..... 713
Little Gem pipe wrench attachment.... 67
Lock trimmings, Elaine design..... 821
Locomotive fuel, Coke as..... 814
London, American Engineers in..... 8
London workmen Paris Exposition.... 55

Long credits and cut prices..... 319
Long-time contracts.....844, 887
Louisville..20, 58, 99, 136, 180, 216, 253 293, 334, 414, 453, 491, 534, 576, 612 650, 691, 729, 770, 810, 853, 891, 932, 971, 1010
Louisville pumping engines..... 359
Lower drift of prices..... 288
Lower duties, New England asking.... 52
Lowering of the interest rate..... 287
Lubricating car-axles..... 209
Lucigen lamp..... 168
Lumber barge, A famous..... 476

MacCoy's pneumatic tool..... 242
Machine, Band-sawing..... 743
Machine Co.'s works, Westinghouse.. 954
Machine for making rolled forgings.... 202
Machine for making wire rope..... 281
Machine for rolling car-wheels..... 199
Machine for screwing pipes together... 243
Machine, Metal-sawing..... 562
Machine, Wrestling..... 781
Machinery castings, Ferro-silicon for... 968
Machinery, Continuous molding..... 79
Machinery, Key-seat cutting.. 677
Machinists' tools, A set of..... 464
Mail-service, A shop. 571
Maine ice creeper..... 902
Mallets, Raw-hide bound..... 587
Mammoth gun..... 638
Management, blast-furnace..... 240
Manganese ore..... 714
Manganese ores, Analysis of..... 517
Manual of Machine Construction for Engineers, Draftsmen and Mechanics... 390
Manufacture in the South, Basic-steel.. 966
Manufacture of aluminum alloys in the electric furnace..... 752
Manufactured iron, Southern freights on 797
Manufacturers migrating westward.... 569
Manufacturing..12, 49, 51, 89, 128, 171, 208, 245, 283, 326, 367, 406, 445, 481, 522, 566, 603, 642, 681, 720, 761, 800, 848, 882, 923, 964, 1001
Maritime exhibition, Bethlehem at the. 952
Maritime Exhibition, The Boston..... 774
Markets by telegraph....695, 733, 774, 814, 854, 894, 936, 975, 1015
Marking patterns, A system of..... 363
Marlin's safety repeating-rifle..... 822
Marquette iron projects..... 579
Martin's guides and foot-lock for sliding-doors..... 742
Massey's Perfect vise..... 663
Master mechanics, American railway.. 192
Material progress in Europe..... 798
McLean patent tacks..... 303
McNeill's balanced charging-barrow... 624
Meat-cutter, The Perfection..... 663
Mechanical engineers.....894, 833
Mechanical telephone, The pulsion..... 991
Mechanics of engineering..... 32
Merchandise marks act, English..... 524
Metal-cutter, Elm City..... 544
Metal-edge system of box-making.....1022
Metal goods, stamped sheet..... 389
Metal market.22, 60, 100, 138, 182, 218, 257, 294, 334, 377, 417, 454, 493, 534, 577, 616, 653, 693, 732, 771, 812, 852, 892, 934, 974, 1014
Metal, Rolling bars and rails from molten 236
Metal, Rolling liquid..... 39
Metal-sawing machine..... 562
Metal shingles, Hamsley..... 742
Metals, Our foreign trade in..... 211
Metallic hanger for Venetian blinds.... 191
Metallic railroad-ties..... 17
Metropolitan water-waste detector..... 585
Mexican lead-ore decision..... 644
Mexican lead ore importations..... 967
Mexican silver-lead ore 758
Mexican silver-lead ore, The importation of..... 763
Mexican trade, How to secure.....1015
Mexico and Japan..... 88
Mexico, Recent developments in..... 525
Michigan anti-trust law, The..... 87
Middlesborough, Two days in..... 276
Migrating westward, Manufacturers... 569
Milling-machine, Universal..... 991
Mincer, Gem solid-steel..... 702
Mineral production of New Jersey..... 7
Mining engineers..... 554
Minnesota Car Company's works..... 289
Missouri's anti-trust law..... 606
Miter-box No. 6, Olmsted's improved.. 586
Models at the marine exhibition, Steamship..... 793
Modjeska curling-iron..... 463
Molding machinery, Continuous..... 79

Monetary crisis at Buenos Ayres..... 409
Monkey-wrench, Cline's..... 227
Monitor, Armored cruiser..... 914
Monitor Terror, Pneumatic gun mounts 718
Monster trusts..... 93
Mop-stick, The Trojan..... 821
Motive power, Compressed air as a.... 837
Motive power, Heat-energy into..... 807
Motors, Electric..... 929
Motor-work, Profit in 520
Movement in trust stocks..... 484
Mullin's silica process..... 124
Murbarger's anti-rattler..... 108
Myer's improved glass valve-seat..... 501

Nail-puller, The Hawkins patent..... 343
Nail-machine, Five-wire..... 313
Nail trade, Western..... 724
National currency, A new 793
National Forge and Iron Company..... 403
Natural gas for Chicago..... 751
Naval Affairs, Notes on..... 54
Navy, Our new..... 797
Navy, The new American..... 235
Navy-yard tugs, New 220
Negotiations for the sale of the Thomas Iron Company..... 330
Nelson cresttile lighting-conductor.... 742
Never-break wrought-steel hollow-ware. 942
New center-gauge..... 86
New combination tool..... 343
New departure call-bell..... 501
New England asking lower duties..... 52
New filtering-machine..... 871
New form of buffing-wheel.....1022
New ice-creepers..... 543
New Jersey, Mineral production of.... 7
New key-holder..... 860
New method of handling steel ingots... 237
New method of securing flues..... 791
New pattern stove-pipe collar..... 703
New pipe-hooks, expansion-plates and ring-plates..... 782
New polytechnic school..... 801
New publications.....32, 152, 390, 774
New snatch-block..... 740
New stove-pipe collar..... 623
New torpedo-boat Cushing..... 976
New vessels, Contract trials of..... 794
New wire box-strap.....1023
New works, Bement, Miles & Co 744
New works of G. A. Crosby & Co..... 795
New York.....21, 59, 99, 137, 181, 217, 255, 293, 334, 376, 416, 453, 492, 534, 576, 614, 652, 692, 731, 772, 812, 853, 893, 933, 973, 1012
New York, Iron-ore production of..... 125
New York Metal Exchange....22, 139, 183, 257, 288, 295, 335, 377, 417, 454, 494, 535, 577, 616, 653, 694, 732, 771, 812, 852, 892, 935, 974
Newman emery planer, The..... 84
Next century of the Republic..... 437
Niagara bridge, Another..... 449
Niagara continuous bar-folder..... 600
Niagara Stamping and Tool Company.. 192
Nickel, Cheap..... 568
Nitrogen contained in ingot-iron..... 519
Norfolk dock, The new..... 475
Northwest, Penetrating the.....1007
Norton fluid-metal rolling process 752
Notes of the electric light convention.. 320
Notes on electric railways using Thomson-Houston system..... 84
Notes on naval affairs..... 54
Notes on the manufacture of open-hearth bridge-steel..... 327
Novel street-car motor..... 751
Novelties of the Clement Mfg. Co..... 623
Nut-lock, Edgar's universal. 820
Nut-lock, The Jenkins..... 543
Nut-tapper and pipe-threader, Bolt-cutter..... 3
Nut-tapping machine, Bolt-threading and..... 791
Nut-wrench, Ratchet and..... 344

Obituary 55, 95, 132, 176, 212, 250, 330, 449, 484, 529, 569, 610, 646, 685, 725, 807, 886, 968, 1007
Ocean lane routes..... 962
Ocean mail routes, Contemplated changes in..... 329
Ocean racers Coal consumption of..... 330
Ocean racers, Six new..... 793
Official railway list for 1889..... 152
Oil-burner, The Russell..... 919
Oil-can, The Leader..... 264
Oil-cup, The I X L..... 226
Oil field, The Lima..... 836
Oil Trust case, The Cotton-Seed.. 5

Old rails, Supply of..... 448
Olmsted's improved miter-box No. 6.... 586
Open-hearth bridge steel, Notes on the manufacture of..... 327
Open-hearth furnaces, Chrome iron-ore linings in..... 495
Open-throat shear..... 563
Operators organizing, Coke..... 443
Opportunities wasted by iron manufacturers..... 967
Ore, Manganese..... 714
Ore, Mexican silver-lead..... 758
Ore output, The lake..... 567
Ore-pan, Revolving dry-grinding..... 920
Ore shipments..... 441
Ore trade next year, The lake..... 764
Organizations of agriculturists..... 684
Ornamental fencing, Solid steel barbed 902
Otis Iron and Steel Works, Sale of, confirmed..... 91
Otis Works, Transfer of the..... 177
Our active furnaces..... 927
Our imports of iron and steel..... 967
Our Navy..... 874
Our new Navy..... 797
Outlook, The..... 369, 1005
Output of Gogebic ore..... 477
Outside window-fasteners, Brook's..... 861

Padlock, The Universal..... 782
Padlocks, Wrought-brass self-locking horseshoe..... 662
Paint-burner, The boss fire-pot and.... 68
Palace, A blue-grass..... 379
Pan-Americas Congress at Washington. 524
Paragon skewer-puller..... 151
Paris, Compressed air system in..... 537
Paris Exposition, 204, 236, 323, 371, 398, 436, 516, 570
Paris Exposition, Electric traveling cranes at the.....478, 512
Paris Exposition, London workmen at 55
Paris Exposition, The illuminated fountains at the 356
Paris, The awards at..... 607
Patent adjustable three-way cock..... 861
Patent decision, Important..... 265
Patent Office, Work of the..... 477
Patent self-priming pitcher pump..... 780
Peekskill Bridge..... 488
Peekskill, Hudson River Bridge at..... 175
Pelton water-wheel..... 322
Penalties, Ship-builders'..... 329
Pencoyd Iron Works..... 322
Penetrating the Northwest.....1007
Perfection flour-bin and sieve..... 502
Perfection meat-cutter..... 663
Perfection sad-iron..... 901
Perfection self-closing cock..... 545
Personal, 55, 95, 133, 176, 213, 251, 306, 372, 412, 449, 488, 530, 572, 626, 664, 704, 726, 766, 807, 847, 904, 929, 969, 1004
Perspective..... 774
Peru, Late developments in..... 131
Peru, The Grace contract in..... 1006
Petit-Bourg, Decauville Works at. .. . 95
Petroleum for engines..... 504
Petroleum trade, Russian..... 174
Philadelphia...18, 57, 96, 134, 179, 214, 253, 291, 332, 373, 413, 450, 490, 531, 574, 611, 651, 690, 727, 768, 808, 852, 889, 930, 970, 1012
Philadelphia's tall chimneys..... 167
Picture-hanger, The Crown..... 703
Picture-nail, The Crown..... 701
Pig, Cost of producing..... 687
Pig-iron competitors, Great..... 802
Pig-iron, Production of..... 177
Pig-iron production, Statistics of..... 152
Pig-iron rates, Southern..... 609
Pig-iron warrants.....441, 448
Pilot-feed, Screw-machine with..... 519
Pineville coke..... 876
Pipe bending and coiling machine..... 201
Pipe-closer, The Sexton..... 585
Pipe cutting and threading machine, New..... 48
Pipe-hooks, expansion-plates and ring-plates, New..... 782
Pipe joint, Steam..... 839
Pipe, Steel..... 10
Pipe trade, Cast-iron..... 177
Pipe-wrench attachment, Little Gem... 69
Pipe-wrench jaws, Atwater's..... 265
Pipe-wrench, The Trimo..... 625
Pit heating furnace, The Laureau..... 673
Pittsburgh....20, 57, 98, 136, 181, 215 254, 291, 332, 375, 415, 451, 491, 532, 575 613, 650, 689, 730, 769, 810, 854, 891, 933, 972, 1010
Pittsburgh freights..... 744
Pittsburgh tax decision, important..... 43
Pittsburgh to Chicago, Competing railroad from..... 601
Planer attachment, Rock-cutting..... 397
Planer-chuck..... 243
Planing-machine, Seventy-two-inch.... 553
Planing-machine, Spiral-geared....511, 912
Plans of new works..... 940
Plans, Rapid-transit..... 408
Planters' hoe, Sure-hold..... 860
Plots and counterplots, Labor..... 966
Plumbing-work, Hooks for..... 942
Pneumatic gun-carriage..... 598
Pneumatic gun-mounts for the monitor Terror..... 718
Pneumatic railway system..... 911
Pneumatic tool, MacCoy..... 242
Pneumatic torpedo-gun..... 228
Pole-cap, The Common-sense..... 901
Polytechnic school, New..... 801
Poor's railroad statistics..... 241
Portable hoist..... 87
Possibilities of iron manufacture in Canada..... 686
Potato-peeler..... 426
Power hammer..... 166
Prentice metallic hip-shingle..... 662
Prescott door-hanger..... 545
Preservation of forests, The..... 926
Press, New beef-tea..... 428
Preventing waste of heat in the steam-engine..... 831
Prevention of boiler incrustation.....1024
Prices in the West, The advance in.... 685
Prices, Lower drift of..... 288
Princeton scientific graduates..... 2
Problem, The through-rate..... 920
Proctor's three-row corn-planter..... 741
Production of pig-iron..... 177
Profit in motor-work..... 520
Profit-sharing 503
Progress in Europe, Material..... 798
Prony-brakes, Use of ropes for.....1000
Proportions of steam-cylinders..... 900
Prospectuses of Southern iron companies 173
Prosperity in the iron trade..... 925
Protective duties and the World's Fair. 287
Providence cable tramway, The new... 952
Providence notes.....795, 878, 968
Pulley, Double-spoke..... 753
Pulley, Leather-covered 1000
Pullman Palace Car Company..... 637
Pulsator pump..... 879
Pulsion mechanical telephone..... 991
Pumping-engines, Louisville..... 359
Pumping-engine, Worthington high-duty..... 203
Pumps for boiler-feeding..... 558
Pump-valves, Cornish or double-beat... 162
Punch, Hand-power..... 151
Purifying-cup, The Mild..... 463

Rack-cutting planer attachment..... 397
Radial drill, Wall..... 10
Rail sections and uniform tests, Standard..... 435
Rails, Rolling steel..... 838
Rails, The demand for heavy..... 248
Railroad decision, Important..... 199
Railroad from Pittsburgh to Chicago, A competing..... 601
Railroad in Chicago, An elevated..... 441
Railroad investments in the South..... 568
Railroad mileage in 1889, New..... 92
Railroad service, Cheapness of American 14
Railroad shops, New 401
Railroad signal, A new..... 476
Railroad statistics, Poor's..... 241
Railroad ties, Metallic..... 17
Railroad transportation and Canadian competition..... 210
Railway, Canadian ship..... 110
Railway combination..... 756
Railway, Electric..... 277
Railway list for 1889, Official..... 152
Railway shops, Cranes in..... 792
Railway system, Pneumatic..... 911
Railway system, The Weems..... 399
Railway wheels and rails..... 3
Ramel-Conley direct process..... 640
Range, The Vermilion..... 716
Rapid-adjusting hand-screw 343
Rapid-transit plans..... 408
Rapid-transit problem abroad..... 202
Ratchet and nut-wrench..... 344
Ratchet auger-handle..... 503
Ratchet sash-center and transom adjuster, Palmer's..... 662
Rawhide-bound mallets..... 587
Reading Iron Company..... 604
Reaming-machine, Hand..... 126
Re-appearance of special prices.....1006
Recent customs decisions..... 169
Recent failures in cotton and wool..... 329
Recent legal decisions.....266, 306
Record of the Spring Lake furnace.... 877
Reel, Improved automatic..... 701
Reeves wood split-pulley..... 319
Regeneration of Hayti..... 764
Reliable steam-pump..... 364
Re-opening of the Tilly Foster iron mine 362
Repeating rifle, Marlin's safety..... 822
Report of the Director of the Hint..... 726
Republic, Next century of the..... 437
Review of the wholesale market in paints and oils..28, 66, 106, 148, 189, 225 262, 302, 341, 386, 425, 462, 500, 541, 583, 621, 661, 700, 739, 779, 819, 859, 900, 941, 982, 1021
Revolution, Brazilian..... 803
Revolving dry-grinding ore-pan..... 920
Rhode Island, Iron-making in..... 318
Right to use door and window screens.. 191
Roasting iron ore..... 445
Robbins, S., & Son, Failure of..... 4
Robert process..... 674
Robie screw-jack..... 125
Rocking coal and ash sifter..... 625
Rolled forgings, Machine for making.. 202
Rolling bars and rails from molten metal 238
Rolling fluid metal..... 212
Rolling liquid metal..... 39
Rolling steel rails..... 838
Rolling steel rails, The discussion on.... 886
Roll-lathe..... 911
Rolls for fluid-steel rolling..... 797
Roofing double-seamer, Improved..... 305
Rope, belt and gear driving..... 983
Rope-block, Differential..... 879
Rope-transmission, An example of..... 637
Ropes for prony-brakes, Use of.....1000
Rotary circling and slitting shear..... 78
Routes, Ocean lane..... 962
Royal Albion bath-tub 623
Russell oil-burner, The..... 919
Russian petroleum trade..... 174
Ryder's balloon chimney-cap and ventilator 389

Sad-iron, The Perfection..... 901
Safety-lamp, The A. & W. Arc..... 389
Salt combination..... 131
San Domingo to American commerce, Opening..... 77
San Francisco, New steel works at 84
Sand-blast for cleaning castings..... 918
Sargent's patent double-stroke door-bells..... 31
Sash-cord fasteners 860
Sash-lock, Standard rim-spring..... 318
Sash-pulley, Ideal..... 227
Savings-bank, Toy 303
Savings-bank, Trick-dog toy..... 31
Sawtell's improved file-card..... 703
Scientific graduates, Princeton..... 2
Scotch iron, The exit of..... 843
Scrap shear..... 711
Screw-jack, Robie..... 125
Screw-machine 958
Screw-machine, New..... 871
Screw-machine with pilot-feed..... 519
Screw-nails..... 304
Screwing pipes together, Machine for.. 243
Scripps League expedition, The..... 62
Scripps League, The..... 133
Securing cheaper fuel at Pittsburgh.... 126
Security hames-fastener..... 586
Self-closing cock, Perfection..... 545
Self-heating and folding bath-tub, The Goodridge..... 226
Self-heating flat-iron..... 264
Self-locking horseshoe padlocks, Wrought-brass..... 662
Self-priming pitcher-pump, Patent..... 780
Sexton pipe-closer..... 585
Shafting-grinder..... 167
Shaping-machine for gun work..... 671
Shear, Open throat..... 563
Sheet-iron, Craig Russia..... 132
Ship-builder, Government as a..... 524
Ship-builders, Academy and home for American..... 562
Ship-builders busy, Eastern..... 798
Ship-builders' penalties..... 329
Ship-building in 1888..... 369
Ship-building of the world..... 212
Ship-building on the lakes. 951
Shipping, American and British..... 596
Ship-yard, A Chicago..... 969
Ship-yards, Bay City (Mich.)..... 601
Shop mail service..... 571
Shops, New railroad 401

Short taps, tap-wrench, &c., Elterich's. 862
Siemens furnace, The new..... 556
Signal, A new railroad..... 476
Sigua iron mines, Cuba..... 997
Silica process, The Mullins..... 124
Silver question, The..... 606
Silver, The advance in..... 844
Sir Humphrey Davy toaster..... 543
Situation in lead..... 447
Six hundred thousand dollars for a share of stock..... 354
Skewer-puller, Paragon..... 151
Sliding-doors, Martin's guides and foot-lock for..... 742
Slitting-shear, Rotary circling and 78
Smith hose-coupling, The 69
Smoke-consumer, Test of a..... 796
Smoke nuisance in Chicago..... 448
Snatch-block, A new..... 740
Snow-shovel and scraper combined, Gifford's hand..... 624
Snow's steel mat.....1023
Societe, The Cape Copper Company and the..... 337
Soft-coal combination..... 712
Soft-ground horseshoe..... 190
Soldering machine, Tube..... 161
Solid-steel barbed ornamental fencing . 902
Solid-steel husking-pin, Hubbard's..... 501
Sorting freight-cars by gravity..... 504
South African industrial interests..... 54
South America, Trade with..... 78
South, Railroad investments in the.... 568
South, Wild-cat schemes in the..... 649
Southern freight rates.....546, 943
Southern freights on manufactured iron.....725, 797
Southern iron companies, Prospectuses of 173
Southern iron freights..... 411
Southern iron, Wide distribution of.... 7
Southern pig-iron rates..... 609
Southern project, An important..... 523
Special prices, The re-appearance of....1006
Specifications for steel for fire-boxes and boilers 1024
Speculation in English pig-iron warrants, The..... 965
Speculation in the Argentine Republic.. 278
Speed-lathe, Heavy..... 169
Speed of vessels, Testing the..... 871
Spiral-geared planing-machine.....511, 912
Spirally-welded steel tubes..... 872
Spring hinge..... 860
Spring Lake Furnace, Record of the... 877
Springs, Forming elliptic..... 44
Sprue-cutter..... 440
"Square-turned" work..... 743
Squaring and trimming shear..... 717
Squaring shear..... 915
St. Clair Tunnel, The..... 911
St. Lawrence route, Failure of the.... 15
St. Louis..20, 58, 99, 136, 180, 216, 253, 292, 333, 374, 414, 453, 491, 533, 575, 612, 652, 692, 729, 770, 809, 850, 890, 931, 971, 1010
St. Paul, Holly steam heating in.....1023
Stamped sheet-metal goods..... 389
Stamping and Tool Company, Niagara.. 192
Standard header..... 442
Standard rail sections and uniform tests 435
Standard rim-spring sash-lock..... 388
Star coffee-pot..... 463
Stark multiple boring-machine..... 638
Statistics, Canadian..... 277
Statistics of pig-iron production..... 152
Steam-boat inspection service..... 672
Steam-boiler, The..... 645
Steam-boilers, their management and working on land and sea..... 390
Steam-cylinders, Proportions of..... 900
Steam-engine design..... 390
Steam-engine, Improved Corliss..... 520
Steam-engine valve..... 876
Steam-engine valve, New..... 917
Steam-engine working-beam..... 6
Steam-generator, Austin improved.... 703
Steam-heating in St. Paul, Holly.....1023
Steam-pipe joint..... 839
Steam-pump, Reliable..... 364
Steamer Teutonic..... 274
Steam-ship communication, Transpacific..... 87
Steam-ship lines, Subsidies to Canadian 24
Steam-ship lines, The German subsidized..... 91
Steam-ship models at the Marine Exhibition..... 793
Steam-ship project, Corbin..... 161
Steam-ship subsidies..... 278
Steam-trap, Automatic..... 477
Steel-armored acid-conduit..... 243
Steel-bowl dipping-tank..... 465
Steel-bowl wagon-truck..... 502
Steel Company, The Illinois..... 733
Steel, Drifting tests of..... 42
Steel famine, Consequences of the..... 644
Steel for boilers..... 993
Steel for fire-boxes and boilers, Specifications for.....1024
Steel griddle, A new..... 69
Steel ingots, New method of handling.. 37
Steel mat, Snow's.....1023
Steel pipe..... 10
Steel process, The basic..... 119
Steel production, Bessemer..... 176
Steel rails, Life of..... 7
Steel rails, Rolling..... 838
Steel rapidly supplanting iron..... 597
Steel, The advance in..... 843
Steel trades, Foreign iron and..... 483
Steel-tray wheelbarrows, Railroad pattern..... 426
Steel tubes, Spirally-welded..... 872
Steel-works at San Francisco, New.... 8
Steel Works, The Latrobe..... 958
Steeple compound, Eight horse-power.. 353
Stock, Six hundred thousand dollars for a share of..... 354
Stone sawing with helicoidal wire cord. 353
Store-truck, Combination..... 587
Storm-house, Leonard's patent portable 625
Stove-boards, New designs in..... 503
Stove-pipe, Adjustable.....1023
Stove-pipe collar, New..... 623
Stove-pipe collar, New pattern..... 703
Stoves abroad, Cooking and heating..783, 823
Stoves at Emma furnace, The Ford & Moncur..... 466
Street-car motor, A novel..... 751
Strength of alloys at different temperatures..... 639
Strength of beams and columns..... 32
Sugar campaign, Cuba and the new.... 724
Sugar market, Course of the..... 447
Supply of old rails..... 448
Sure-hold planters's hoes..... 860
Surface-planer, Emery-wheel..... 518
System of box-making, Metal-edge.....1022
System of marking patterns..... 363
Swan's drawing-knife..... 781
Swing-socket fastener, Geneva patent.. 740

Tacks, The McLean patent..... 303
Tandem compound engine..... 831
Tap-wrench, &c., Elterich's short-taps. 862
Tariff decisions, Important..... 126
Tariff, Windom and the..... 477
Tax decision, Important Pittsburgh.... 43
Technical literature, Handy list of..... 32
Telephone, The pulsion mechanical..... 991
Test of a smoke-consumer..... 796
Tests of aluminum alloys..... 638
Tests of Bower-Barffed iron..... 636
Testing coil boilers..... 220
Testing copper, Excellent results in.... 265
Testing the speed of vessels..... 871
Teutonic, The new steamer..... 274
Texas, Armor for the..... 282
The quicksilver trade..... 257
Theisen condenser..... 404
Thermometer sad-iron, Gem patent..... 427
Thomas Iron Company, Negotiations for the sale of the..... 330
Thomas Iron Company, Sale of the..... 466
Thomson-Houston system, Notes on electric railways using..... 84
Thorough fire-proof construction..... 884
Threading and knurling machine..... 794
Threading machine, New pipe-cutting and..... 48
Threatened strike of coke-workers..... 175
Three-way cock, Patent adjustable..... 861
Through-rate problem, The..... 920
Tilly Foster iron mine, Reopening of the 362
Time, Bethlehem ahead of..... 7
Tin-plate plant, Experimental..... 169
Tin-plate Works, A French..... 250
Tin prospects, American.....1005
Tin-ware, Evan's patent anti-rusting... 150
Tinners and plumbers, Cold-blast furnace for..... 743
Tinning hard-steel or case-hardened articles..... 202
Toaster, Sir Humphrey Davy..... 543
Tool cabinet, Combination..... 303
Tools, A set of machinists'..... 464
Torch, A new gasoline..... 31
Torpedo-boat Cushing, The new..... 976
Torpedo-gun, The pneumatic..... 228
Toy savings-bank..... 303
Trade, Canadian..... 530
Trade, Chicago's position in the iron... 926
Trade in 1888-89, British Indian..... 93
Trade of South America, Barb-wire.... 228
Trade, Our Cisatlantic..... 564
Trade prospects with American nations. 328
Trade, Prosperity in the iron..... 925
Trade relations, A Western view of.... 419
Trade Report, 18, 56, 96, 134, 178, 214, 252, 290, 331, 373, 413, 450, 489, 531, 573, 610, 649, 689, 727, 768, 808, 850, 888, 930, 970, 1010
Trade with South America..... 78
Trade with Venezuela, Our..... 248
Transfer of the Otis Works..... 177
Transom adjuster, Palmer's rachet sash-center and..... 662
Transpacific steam-ship communication. 87
Transportation interests, Federation of. 183
Treasure-box..... 151
Treasury decision on drawbacks..... 124
Treatment of steel by hydraulic pressure..... 85
Trials of new vessels, Contract..... 794
Trick-dog toy savings-bank..... 31
Tricks of buyers..... 703
Trimo pipe-wrench..... 625
Trojan mop-stick..... 821
Truck, The Bristol..... 902
Trust stocks, Movement in..... 484
Trusts, Another blow at..... 877
Trusts, Disintegration of the..... 723
Trusts, Monster..... 93
Trusts, The Law and the..... 275
Tube-cleaner, Duplex..... 503
Tube-soldering machine..... 161
Tugs, New navy-yard..... 220
Tumbling-barrel for burnishing..... 88
Tunnel, The St. Clair..... 911
Turn-buckle, New..... 265
Twisted iron..... 428
Two-spindle drill..... 365

U. S. steam whale boat..... 273
U. S. steel twin-screw gun-boats..... 16
Uniform bankrupt law..... 403
United States of Colombia, The..... 78
United States patents, Effects of foreign patents on..... 248
Universal milling-machine..... 901
Universal padlock..... 782
Unprotected steam-pipes, Heat lost by.. 836
Upright self-feeding drill..... 718
Uruguay, Late developments in..... 645
Use of ropes for prony brakes.....1000

Valley duplex pump..... 751
Valve, New steam-engine..... 917
Valve-seat, The Myers improved glass.. 501
Valve, Steam-engine..... 876
Valve, Water-gauge..... 794
Van Duzen's improved cake molds..... 31
Variety hand elevator..... 820
Venetian blinds, Metallic hanger for... 191
Venezuela, Our trade with..... 248
Vermilion range..... 716
Vessels, Testing the speed of..... 871
Vesuvius, The..... 638
Vibration in buildings..... 515
Victor coal-hods..... 781
Virginia Development Company..... 766
Vise, Massey's Perfect..... 663
Vises, New..... 587

Waddel's improved coffee-mill..... 227
Wages, American and European..... 925
Wages of iron-molders..... 792
Wagon-skeins, Special cast-iron..... 426
Wagon-truck, Steel-bowl..... 502
Walker's beverage-mixer..... 30
Walker's double-cutter ice-shave and adjustable ice-grip..... 68
Walker's bandy ice-plane..... 69
Waltham key-holder..... 426
War material, Our progress in the production of..... 370
War on combinations, The Western.... 884
War-ships, Composite..... 282
War-ships, Faulty British..... 442
Warming buildings, The hot-blast system of..... 5
Wash-bowl, Barrett's recessed..... 109
Washington news...110, 176, 286, 346, 528, 588, 626, 664, 688, 784, 824, 887, 928, 969, 1009
Water-gauge, Electric automatic..... 190
Water-gauge valve..... 704
Water-waste detector, The Metropolitan 585
Water-wheel, Pelton..... 322
Water-way, Canada's new..... 837
Water-way, Chicago's proposed..... 792
Watervliet Arsenal, The work at..... 356
Wave motor..... 220

Wealth of Australia..... 165
Week, The....11, 49, 90, 127, 170, 207, 244, 285, 325, 366, 405, 444, 480, 521, 565, 602, 641, 680, 719, 759, 799, 842, 880, 921, 962, 1003
Weems railway system..... 399
Weiss reversing furnace-valve..... 601
Welded steel tubes, Spirally..... 872
Welding and corrugating cylinders.... 756
Welding by electricity..... 634
Western nail trade..... 721
Western outlook for foundry pig-iron, 966
Western view of trade relations..... 419
Western war on combinations..... 884
Westinghouse Machine Co.'s works... 954
Whale-boat, U. S. steam..... 273
What a fire-proof building is..... 942
Wheelbarrows, Steel-tray RR. pattern 426
Wheels and rails, Railway..... 3
Whiffletree-coupling, Front..... 780
Wildcat schemes in the South..... 649
Will, The late John Crerar's..... 797
Windom and the tariff..... 477
Window-fasteners, Brook's outside..... 861
Window-holder, Anti-rattler and..... 780
Wire-cable welding by electricity..... 91
Wire-rolling machine..... 1
Wire rope, Machine for making..... 281
Wire trade, The..... 483
Witter's improved flush-bevel..... 544
Wood split-pulley, Iron-center..... 358
Wood split-pulley, Reeves..... 319
Work at Watervliet Arsenal..... 356
Work in electricity, Joule's..... 944
Work of the Patent Office..... 477
Works, Plans of new..... 840
Working-beam, Steam-engine..... 6
Workmen's library and gymnasium.... 726
World's Fair of 1892..... 174
World's Fair, Originality in the..... 483
World's Fair, Proposed..... 165
World's Fair, Protective duties and the. 287
Worthington high-duty attachment.... 315
Worthington high-duty pumping engine 203
Wrench, A new combination..... 822
Wrestling-machine..... 781
Wright's patent fastening device..... 304
Wright's patent vertical movable kitchen safe..... 387
Wrought-steel hollow-ware, Never-break..... 942

Year's foreign trade, A..... 174
Yorktown engines..... 600

ILLUSTRATIONS.

A. & W. arc safety lamp..... 389
Adjustable chimney..... 68
Adjustable stove-pipe.....1023
Allis steel barbed ornamental fencing... 943
Anti-rattler and window holder..... 780
Anvil, A new..... 30
Armored cruising monitor..... 914
Arrangement of stores....143, 301, 341, 383, 423, 459, 778, 896, 980, 1018
Atlas hydraulic-screw elevator..... 639
Atwater's pipe-wrench jaws..... 265
Austin improved steam-generator..... 703
Automatic drill press..... 159
Automatic gear-cutting engine..... 951
Automatic steam-trap..... 477
Avery's detachable belt-fastener..... 190

Band-saw guide..... 954
Band-sawing machine..... 743
Barrett's recessed wash-bowl..... 109
Belt-power bending-rolls.....600, 919
Belt shifter..... 355
Billet-car..... 275
Blowing-engine..... 118
Bolt-cutter, nut-tapper and pipe-threader 3
Bolt-threading and nut-tapping machine 791
Bristol truck..... 902
Brook's outside window-fasteners..... 861
Buchan's patent drain-pipe..... 226
Buffing-wheel, New form of 1022
Burgin high-speed engine..... 595

Canton glass-board..... 265
Centennial door-bell..... 501
Chain specialties..... 663
Chicago check-perforator..... 463
Clam-roaster..... 344
Clinch for hammers and hatchets..... 387
Cline's monkey-wrench..... 227
Cold-blast furnace for tinners and plumbers..... 743
Cold saw cutting-off machine..... 122
Columbus door-bell..... 545
Combination store-truck..... 587
Combination tool cabinet..... 303
Combined foot-wiper and scraper..... 822
Commodious office, A..... 858
Common-sense pole-cap..... 901
Compound duplex pump..... 796
Condensing engine..... 679
Continuous molding machinery..... 79
Cooking and heating stoves abroad, 783, 823, 862, 903
Cornish or double-beat pump valves.... 162
Corrugated elevator bucket..... 68
Crabb's chuck..... 387
Crary's patent bin and sifter..... 861
Crescent wire coat and hat hook..... 109
Crosby's patent ash-sifter..... 820
Crown picture hanger..... 703
Crown picture-nail..... 701
Cutting-off tools..... 983

Differential cable-drums..... 716
Differential rope-block..... 879
Differential-thread bit-holder..... 389
Die-grinder..... 679
Dirigo folding anchors..... 108
Distance bell..... 544
Dixie back-band hooks..... 502
Drifting tests of steel..... 42
Drilling and countersinking machines.. 678
Dobson's auger-guide..... 741
Door-bells..... 782
Double cutting-off and center-drilling machine..... 798
Double-geared belt elevator..... 999
Double-spoke pulley..... 753
Duplex tube-cleaner..... 503

Edgar's Universal nut-lock..... 820
Eight horse-power steeple compound... 353
Elaine design lock-trimmings..... 821
Electric automatic water-gauge..... 190
Electric railway..... 277
Electric traveling-cranes at the Paris Exposition.....478, 572
Elevator gearing..... 126
Elevator stop and lock..... 345
Elliptic gear-cutting machine..... 400
Elm City metal-cutter..... 544
Elterich's short taps, tap-wrench, &c.. 862
Emery-wheel surface-planer..... 518
Emery-wheels..... 345
Engine lathe and cutting-off machine... 836
Erie key-seating machine..... 77
Eureka door-bell..... 740
Evans patent anti-rusting tin-ware..... 150
Example of rope transmission..... 637
Expansion drill..... 998
Extension brace-bit..... 109

Ferret animal-trap..... 586
Fire-pot and paint-burner, The Boss... 68
Five-wire nail-machine..... 313
Fore-and-aft compound engine..... 435
Forming elliptic springs..... 44
Foundry crane..... 714
Foundry with 80-ton cranes..... 795
Friction-clutch, couplings and pulleys, Arrangement of 996
Friction clutches..... 438
Front whiffletree coupling..... 780

Galvanized-iron cistern..... 344
Gardner patent die-stock..... 427
Gasoline torch, New 31
Gates electric railway..... 404
Gem patent thermometer sad-iron..... 427
Gem solid steel mincer..... 702
Geneva patent swing-socket fastener... 740
German machine for double-locking.... 388
Gifford's hand snow-shovel and scraper combined..... 624
Gilchrist Lightning cork-puller..... 464
Girard hydraulic railway..... 402
Goodridge self-heating and folding bath-tubs..... 226
Grinding machine..... 235

Hamsley metal shingles..... 742
Hand-power punch..... 151
Hand reaming-machine..... 126
Hartman liquid cinder-car..... 713
Hawkins patent nail-puller,..... 343
Hay-knife..... 265
Heavy speed-lathe..... 169
Hill's latch..... 821
Hollow grate-bar..... 753
Holt combined anvil and vise, The..... 942
Hooks for plumbing-work 942
Hubbard's patent buckle-guard..... 464
Hubbard's solid steel husking-pin..... 501
Humphrey's brad-awl handle..... 69
Humphrey's improved awl haft..... 30

Ideal sash-pulley..... 227
Ideal snap..... 502
Illinois Steel Company's new Joliet offices..... 676
Illuminated fountains at the Paris Exposition..... 356
Improved automatic reel..... 702
Improved buffing-lathe..... 466
Improved cooker..... 902
Improved Corliss steam-engine..... 520
Improved roofing double-seamer..... 305
Indestructible door-pull..... 544
Indurated fiber bath-tub..... 305
Iron center wood split-pulley..... 358
Iron toys..... 741
IXL oil-cup..... 226

Jenkins nut-lock..... 543
Jersey corn-husking pin..... 463

Kennedy & Aiken hydraulic crane..... 754
Kennedy beam-end shear..... 633
Key-seat-cutting machinery..... 677
Keytone ice-cream freezer..... 150
King vise cutting-tool..... 540
Kinney's disinfecting chamber-pail..... 46

Lathe for turning special forms..... 362
Laureau pit-heating furnace 673
Leader oil-can 264
Leather-covered pulley.....1000
Leather link-belts..... 701
Lemon-reamer..... 465
Leonard's patent portable storm-house.. 625
Louisville pumping-engines..... 359
Lucigen lamp..... 168

MacCoy's pneumatic tool..... 242
Machine for making rolled forgings.... 202
Machine for making wire-rope..... 281
Machine for rolling car-wheels..... 199
Machine for screwing pipes together... 243
Machinists' tools..... 464
Maine ice-creeper..... 902
Marlin's safety repeating-rifle..... 822
Martin's guides and foot-lock for sliding-doors..... 742
Massey's Perfect vise..... 663
McLean patent tacks..... 303
McNeil's balanced charging-barrow.... 624
Metal-edge system of box-making 1022
Metal-sawing machine..... 562
Metalic hanger for Venetian blinds.... 191
Metropolitan water-waste detector..... 585
Mild purifying cup..... 463
Modjeska curling-iron..... 463
Multiple-spindle drill..... 564
Murbarger's anti-rattler..... 108
Myer's improved glass valve-seat..... 501

Niagara continuous bar-folder..... 600
Nelson cresttile lightning-conductor.... 742

Never-break wrought-steel hollow-ware 942
New beef-tea press 427
New center-gauge 86
New combination tool 343
New combination wrench 822
New Departure call-bell 501
New designs in stove-boards 503
New hot-air engine 473
New ice-creepers 543
New key-holder 860
New method of handling steel ingots 237
New patent burglar-alarm 108
New patent stove-pipe collar 703
New pipe-hooks, exansion-plates and ring-plates 782
New screw-machine 871
New sensitive drill 319
New Siemens furnace 556
New snatch-block 740
New stove-pipe collar 623
New turn-buckle 265
New vises 587
Newman emery-planer 84
Novelties of the Clement Mfg. Company 623

Olmsted's improved miter-box No. 6 586
Open-throat shear 563

Palmer's ratchet sash-center and transom-adjustor 662
Paragon skewer-puller 151
Parker's Lightning corn-cutter 465
Patent adjustable three-way cock 861
Patent self-priming pitcher pump 780
Pelton water-wheel 322
Perfection flour-bin and sieve 502
Perfection meat-cutter 663
Perfection sad-iron 901
Perfection self-closing cock 545
Pipe bending and coiling machine 201
Pipe cutting and threading machine, New 48
Pipe-wrench attachment, Little Gem 69
Place for the burning match 501
Planer chuck 243
Plans of new works 840
Pneumatic gun-carriage 598
Pneumatic gun-mounts for the monitor Terror 718
Portable hoist 87
Potato-peeler 426
Power hammer 166
Prentice metallic hip-shingle 662
Prescott door-hanger 545
Proctor's three-row corn-planter 741
Pulsator pump 879
Pumps for boiler-feeding 558

Rack-cutting planer attachment 397
Ramel-Conley direct process 640
Rapid-adjusting hand-screw 343
Rachet auger handle 503
Rachet pipe and nut wrench 344
Rawhide bound mallets 587
Reeves wood split-pulley 319
Reliable steam pump 364
Revolving dry-grinding ore-pan 926
Robert process at Stenay, France 674
Robie screw-jack 125
Rocking coal and ash sifter 625
Roll-lathe 911
Rolling bars and rails from molten metal 238
Rolling liquid metal 39
Rolling steel rails 838
Ropes for prony brakes, Use of 1000
Rotary circling and slitting shear 78
Royal Albion bath-tub 623
Ryder's balloon chimney-cap and ventilator 389

Sand-blast for cleaning castings 918
Sargent's patent double-stroke door bells 31
Sash cord fasteners 860
Sawtell's improved file card 743
Scrap-shear 711
Screw machine 958
Screw machine with pilot feed 519
Screw-nail 304
Security hames fastener 586
Self-heating flat-iron 264
Seventy-two inch planing-machine 553
Sexton pipe-closer 585
Shafting-grinder 167
Shaping-machine for gun-work 671
Shipping-blank 979
Sir Humphrey Davy toaster 543
Smith hose-coupling 69
Snow's steel mat 1023
Soft-ground horseshoe 190
Solid steel barbed ornamental fencing 902
Special cast-iron wagon skeins 426
Spiral-geared planing-machine 511, 912
Spring hinge 860
Sprue-cutter 440
Squaring and trimming shear 717
Squaring-shear 915
Stamped sheet-metal goods 389
Standard header 442
Standard rim-spring sash lock 388
Star coffee-pot 463
Star fruit-can and glass-jar holder 150
Stark multiple boring-machine 638
Steam-engine valve 876
Steam-engine working-beam 6
Steel-armored acid conduit 243
Steel-bowl dipping-tank 465
Steel-bowl wagon-truck 502
Steel for boilers 993
Steel griddle, A new 69
Steel-tray wheelbarrows, Railroad pattern 426
Sure-hold planters' hoes 860
Swan's drawing-knife 781
System of warming buildings, The hot-blast 5

Tandem compound engine 831
Theisen condenser 404
Threading and knurling-machine 794
Toy savings-bank 303
Treasure-box 151
Trick-dog toy savings-bank 31
Trimo pipe-wrench 625
Trojan mop-stick 821
Tube-soldering machine 161
Tumbling-barrel for burnishing 88
Two-spindle automatic drill 918
Two-spindle drill 365

U. S. steam whale-boat 274
U. S. steel twin-screw gun-boats 16
Universal milling-machine 991
Universal padlock 782
Upright self-feeding drill 718

Valley duplex pump 751
Van Dusen's improved cake-molds 31
Variety hand-elevator 820
Vertical high-speed engine 123
Victor coal-hods 781

Waddel's improved coffee-mill 227
Walker's beverage-mixer 30
Walker's double-cutter ice-shave and adjustable ice-grip 68
Walker's handy ice-plane 69
Wall radial drill 10
Waltham key-holder 426
Water-gauge valve 794
Weems railway system 399
Weis reversing furnace-valve 601
Welding and corrugating cylinders 756
Westinghouse Machine Co.'s works 954
Wire box-strap, New 1023
Wire-rolling machine 1
Witter's improved flush-bevel 544
Worthington high-duty attachment 715
Wrestling-machine 781
Wright's patent fastening device 304
Wright's patent vertical movable kitchen-safe 387
Wrought brass self-locking horseshoe padlocks 662

STATISTICAL AND REFERENCE TABLES.

Activity in lake ship-building..... 605
Aluminum manufacture..... 280
American railroad service, Cheapness of..... 14
Analysis of manganese ore..... 517
Argentine progress..... 15
Armored crusising-monitor..... 914
Attendance at the Paris Exposition..... 479

Bessemer-steel production..... 176
Blast furnaces....53, 249, 410, 572, 609, 764
British Indian trade in 1888-89..... 93
British iron trade..... 168
British prices, Fluctuations in..... 250
Buying iron by the fracture..... 525

Calcined lime as furnace flux..... 960
Charging of blast-furnaces 365
Coal and iron in British Columbia..... 122
Commerce of Lake Superior..... 94
Cost of producing pig..... 687

Drifting tests of steel..... 42

Electric street railroads..... 320
English iron market..... 803
Exhibits of French iron-makers....436, 516
Exports of produce from New York since January 1..... 922

Failure of the St. Lawrence route..... 15
Flax-seed ore of Wisconsin..... 486
Foreign iron and steel trades..... 483
French metallurgical industry..... 371
Furnace, Cost of building a..... ... 325

Gold and silver coinage in 1887-88. ... 288

Hawksbury (Australia) bridge..... 45

Imports of iron and steel..... 967
Iron imports for the half-year..... 247
Iron-ore production of New York..... 125

Japan, Late developments in..... 967

Late developments in Uruguay..... 615

Machines necessary for producing wood-screws..... 401
Metals, Our foreign trade in..... 211
Mexican silver-lead ore.....758, 763
Mineral production of New Jersey..... 7
Monster trusts..... 94

New Siemens furnace..... 556
Next century of the republic..... 437
Nitrogen contained in ingot-iron..... 519

Our active furnaces..... 927
Our Cisatlantic trade..... 564

Pig-iron warrants..... 441
Possibilities of iron manufacture in Canada..... 686
Production of pig-iron..... 177
Production of pig-iron and steel in Pennsylvania..... 206

Report of the Director of the Mint..... 726
Robert process at Stenay, France..... 674
Russian petroleum trade..... 174

Secretary Tracy's report..... 874
Ship-building in 1888..... 369
Ship-building in the United Kingdom.. 685
Ship-building of the world, The..... 212
Shop mail service..... 571
Sigua iron mines, Cuba, The 996
Southern freights on manufactured iron..... .....725, 797
Southern freight rates.....546, 943
Southern iron freights..... 411
Southern iron, Wide distribution of.... 11
Southern pig-iron freights..... 609
Strength of alloys at different temperatures..... 639
Supply of old rails..... 448
System of marking patterns..... 363

Tests of aluminum alloys..... 638
Tests of Bower-Barffed iron..... 636
Tests of open-hearth steel..... 327
Tests of the Redeman-Tilford steel..... 688
Trade prospects of American nations.. 328
Trial of the cruiser Baltimore..... 477
Treatment of steel by hydraulic pressure 85

Use of ropes for prony brakes.....1000

Wealth of Australia..... 165
Welding by electricity..... 634
Westinghouse Machine Co.'s works..... 954